

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A shaped charge engine, comprising:

an inner housing;

5 an outer housing joined to the inner housing to define a plurality of blast-forming regions, each of the blast-forming regions having a primary convergence zone;

a plurality of fuel injectors adapted to inject fuel into each of the blast-forming regions; and

10 a central opening in the inner housing to define a secondary convergence zone in fluid communication with the primary convergence zone, whereby gas charges acquire a shape dictated by the primary convergence zone and a thrust conferred by the secondary convergence zone.

2. The shaped charged engine of Claim 1, wherein the inner housing is generally annular in shape and includes a substantially conical projection that, together
15 with the outer housing, forms the primary convergence zone.

3. The shaped charged engine of Claim 1, wherein the outer housing is substantially domed shaped.

4. A shaped charge engine, comprising:
20 an inner housing;



25315

PATENT TRADEMARK OFFICE

an outer housing joined to the inner housing to define a plurality of blast-forming chambers, each blast forming chamber adapted to receive gas charges and having a primary convergence zone, and a secondary convergence zone in fluid communication the primary convergence zone,

whereby gas charges acquire a shape dictated by the primary convergence zone and a thrust conferred by the secondary convergence zone.

5. The shaped charge engine of Claim 4, wherein the inner housing is generally annular in shape and includes a substantially conical projection that, together with the outer housing, forms the primary convergence zone.
6. The shaped charge engine of Claim 4, wherein each blast-forming includes an igniter and a fuel injector that delivers the gas charges in the form of air-fuel mixtures that are ignited by the igniter to produce exhaust products.
7. The shaped charge engine of Claim 6, wherein each chamber is pivotable in the vicinity of an apex of the outer housing to enable the orientation of each chamber to be varied between a position that directs initial exhaust products in a direction at an obtuse angle with the direction of final exhaust through a position that directs initial exhaust products in a direction at an acute angle with the direction of final exhaust.
8. The shaped charged engine of Claim 6, further comprising a mass injector projecting at least partially into the chamber and connected to a mass source, the mass injector adapted to inject mass into the chamber following air-fuel ignition, wherein the mass comprises water.



25315

PATENT TRADEMARK OFFICE

9. The shaped charge engine of Claim 6 wherein the timing of the igniter is a single firing cycle or a pulsed firing cycle.
10. The shaped charge engine of Claim 6, wherein the oxygen in the air-fuel charges is derived from air or oxidizer sources.
- 5 11. The shaped charge engine of Claim 11, further comprising a sensor to detect the available presence of air mass and a controller in communication with the sensor to adjust the delivery of oxygen to the chamber from air or the oxidizer source.
- 10 12. The shaped charge engine of Claim 4, wherein the inner housing further comprises projections adjustably attached to the inner housing so that the projections may be moved toward or away from the outer housing to decrease or increase the size of a pinch point defining the primary convergence zone.
- 15 13. The shaped charge engine of Claim 4, wherein the engine further includes a turbine rotor mounted and configured to receive exhaust from at least one chamber to provide rotary torque.
- 20 14. A shaped charge engine, comprising:
an inner housing;
an outer housing joined to the inner housing to define a plurality of blast-forming chambers, each blast forming chamber having a fuel injector and an igniter;
an opening in each blast-forming chamber between the inner and outer housings to define a primary convergence zone, the primary zone being variably shaped, and



25315

PATENT TRADEMARK OFFICE

a secondary convergence zone in fluid communication with each primary convergence zone,

whereby the composition and ignition timing of the air-fuel charge in each chamber produces exhaust gases that acquire a shape dictated by the variably shaped primary convergence zone and a thrust conferred by the secondary convergence zone.

15. The shaped charge engine of Claim 14, wherein the inner housing is generally annular in shape and includes a substantially conical projection that, together with the outer housing, forms the primary convergence zone, and the outer housing is substantially dome-shaped.
16. The shaped charge engine of Claim 14, wherein each chamber is pivotable in the vicinity of the apex of the outer housing to enable the orientation of the each chamber to be varied between a position that directs initial exhaust products in a direction at an obtuse angle with the direction of final exhaust through a position that directs initial exhaust products in a direction at an acute angle with the direction of final exhaust.
17. The shaped charge engine of Claim 14, wherein the inner housing further comprises projections adjustably attached to the inner housing so that the projections may be moved toward or away from the outer housing to decrease or increase the size of a pinch point defining the primary convergence zone.
18. The shaped charge engine of Claim 14, further comprising a mass injector projecting at least partially into the chamber and connected to a mass source, the



25315

PATENT TRADEMARK OFFICE

mass injector adapted to inject mass into the chamber following fuel combustion wherein the mass source includes water.

19. The shaped charge engine of Claim 14, wherein the air in the air-fuel charge includes a source of oxygen comprising an oxidizer and a sensor to detect the available presence of air mass and a controller in communication with the sensor to adjust the delivery of oxygen to the chamber from the air or an oxidizer source.

20. The shaped charge engine of Claim 14, wherein the engine further includes a turbine rotor mounted and configured to receive exhaust from at least one chamber to provide rotary torque.

